IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: R. Batlaw et al

Serial Number: 10/764,234

Filed: January 23, 2004

Title: PROCESS FOR MAKING TWO STAGE INJECTION STRETCH BLOW MOLDED POLYPROPYLENE ARTICLES

Group Art Unit: 1732

Examiner: S. Staicovici, PhD

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

DECLARATION OF SHAWN SHEPPARD

This Declaration is submitted with an Amendment in response to the Office Action mailed July 12, 2006.

1. I, Shawn Sheppard provide the Declaration set forth below.

2. I am currently employed as an Advanced Development Chemist for Milliken & Company ("Milliken"), which is headquartered in Spartanburg, South Carolina. I received a Bachelor of Science degree in Chemistry from the University of Georgia in 1998. I am very familiar with the invention claimed and disclosed in the above referenced application. My work at Milliken includes technology relating to injection stretch blow molding applications, relating to that disclosed in this application.

3. I have reviewed the above referenced Patent Office Action and the references cited in the Office Action.

4. True two stage container manufacture is comprised of: (1) injection molding of a perform, followed by cooling of the preform to ambient temperature, followed by (2) stretch blow molding the perform to form a container.

5. There has been a long felt need in the container manufacturing industry for a process of making polypropylene (PP) containers in a manner that produces containers of high quality, good clarity, and low haze at a rate that makes the process economically viable. The invention of the above referenced patent application addresses that industry need.

6. The shape and thickness of preforms determines (1) their suitability for container manufacture, and (2) the speed at which containers may be stretch molded from such preforms. It has been common in conventional polypropylene (PP) processes to employ PP preforms having fairly thick walls. However, thick preform walls reduce the processing speeds that can be achieved. Thick-walled preforms must be cooled longer before removal from a preform mold, thus undesirably increasing processing time in preform manufacture.

7. A disadvantage of prior PP container manufacturing processes has been the inability to make containers of high clarity (i.e. low haze) at a high rate of speed. For example, it has been known to make relatively clear polypropylene containers having a percentage haze value of about 1-1.5 percent haze. However, conventional methods for making polypropylene containers having such low levels of haze have been very

slow. Slow processes are not economically viable in the marketplace. It is a significant and difficult challenge to develop processes that will facilitate increased stretch molding speed while not sacrificing clarity of the resulting PP container.

8. There has been a long felt need in the industry of container manufacturing to provide polypropylene materials, preforms, and container articles in a process that will afford a cost-effective manufacture of low-haze, high clarity products. A process of employing polypropylene (PP) in a manner that will result in highly efficient preform and container production at a minimum cost with a fast cycle time is very desirable.

9. I have reviewed the amended claims of the invention of this patent application. The claims require three specific processing ranges or "windows" to be provided in the practice of the invention. The discovery of these three processing windows, and their synergistic combination in the overall process, is unexpected to a person of skill in the art. The employment of these features in the practice of the invention presents, in my view, unexpectedly good results.

10. In the Office Action, it is stated that it would be obvious to reconstruct the invention from the prior art by providing a wall thickness of 3.6 mm as taught by Valyi, by combining that teaching of Valyi with the teachings of Sato. I do not agree. Valyi's teachings relate almost exclusively to PET – not to PP. Valyi teaches that cooling rate at the injection step is what determines final bottle clarity --- and that is not true for polypropylene ("PP"). Thus, it appears to me that those of skill in the art would recognize that the teachings of Valyi are directed to PET, not PP. PET performs must be largely amorphous to blow properly and to have good clarity. To prevent

crystallization, the material is rapidly quenched from above its melting point and through its glass transition temperature. Those of skill in the art, however, would know that the glass transition temperature of PP is about 0 degrees C, whereas the glass transition temperature of PET is very different, i.e. about 75 degrees C. It is impractical to rapidly quench PP below its glass transition temperature in an industrial process. Even if it could be done, it would not solve the issues and challenges of using PP, since the issue here is related to shear during injection --- and not due to crystallinity. Further, PP performs typically have about 50% cryatallinity by weight, whereas PET performs would be less than about 10% crystalinity by weight in the orientable section. This is a big difference. Further, Valyi does not teach fill rate as claimed, nor does Valyi teach haze levels as claimed. For these reasons, it would not be expected or obvious for a person of skill in the art to combine the teachings of Valyi with Sato.

11. With regard to the combination of Oas and Sato, this suggested combination would be technically incompatible. Oas teaches a composite stretch ratio of 5.76, whereas Sato teaches 14. The performs (parisons) for the two processes are incompatible, and therefore, it would not be obvious for a person of skill in the art to combine the teachings of Oas with the teachings of Sato, and it would be recognized that the teachings are not compatible.

12. In the invention of this application, processing "windows" for variables of perform sidewall thickness, polymer MFI, and injection rate were discovered only after significant and extensive engineering research and development work. When processing windows for each of these three variables are employed, it leads to

exceptional and desirable PP bottles having low levels of haze, and at high production rates. The prior art, to my knowledge, does not disclose such a process, as claimed in the above referenced application for patent. If the prior art could address the current industry needs, and if it did disclose the processing windows of this invention, there would be no need to engage in the current research and development efforts being expended in the industry. The prior art does not disclose or render obvious the invention of this application.

13. Valyi, Oas, and Sato teach processes of 1-stage injection stretch blow molding, not 2-stage. In 1-stage injection stretch blow molding, the parison formed in the injection step is cooled only to the point that is necessary to remove it from the injection tooling. The center of the thickness [core] of a parison formed by this process is significantly warmer than the surface, and the core temperature is dependent upon the wall thickness of the preform as well as the rate at which the polymer is injected into the mold cavity. Polymer temperature determines the ease of stretching the material, and thus preform thickness and injection rate have a profound effect on the final wall thickness distribution of the final container in 1-stage injection stretch blow molding. In true 2-stage injection stretch blow molding, as in the invention of this application, the exterior region of the preform wall is always warmer than the core after reheating—*which is the opposite situation from 1-stage processes*. Thus, for this reason as well it is not obvious to adapt or combine the teachings of Valyi, Oas, and Sato to achieve the invention.

14. I further declare that all statement made herein, of my own knowledge, are true and that all statements made on information are believed to be true. Furthermore, these statements were made with the knowledge that willful false statements and alike so made are punishable by fine or imprisonment, or both, under Section 1001 Title 18 of the United State Code, and that such willful false statements may jeopardize the validity of the above referenced patent application or any patent that may issue thereon.

Shawn Sheppard

Date August 31, 2006